TIERED SKIMMER BASIN  **Detail**

A Tiered Skimmer Basin is a series of temporary basins with trapezoidal spillways lined with filter fabric and equipped with a floating skimmer at the lower basin for dewatering from the top of the water column. It is often used at the outlet of larger drainage areas that discharge into or near sensitive watersheds, where the elevation difference between the inlet and outlet will be too large for just one skimmer basin. Tiered skimmer basins dewater into one another through plastic pipes, with any excess water to flow through the spillway into the next basin. The tiered skimmer basin is designed to dewater at a controlled rate with a step-pool approach, which helps ensure maximum efficiency of the device by allowing a greater settling time for sediment, and releasing the cleanest water from the top of the water column. Flow through all emergency spillways is a function of the tiered skimmer basin.

AREAS OF USE:

- Tiered Skimmer Basins may be used in areas that are near high quality waters, buffer zones, environmentally sensitive areas, and/or sensitive watersheds.
- Tiered Skimmer Basins may be used in areas where drainage areas are too large for a basin with a standard rock weir, and where the elevation difference between the inlet and outlet ends will be 5 ft. or greater.

DESIGN CRITERIA:

- Drainage area should be 10 acres or less.
- Total tiered skimmer basin length to width ratio should be at least 2:1, but not exceed 6:1.
- Basin depths should be at least 2 feet.
- Minimum total volume should be 1800 cubic feet per acre of disturbed area.
- Minimum total surface area should be 325 square feet per cfs of Q_{10} peak inflow.
- Minimum dewatering time of the lower basin is 24 hours, and the maximum should be 72 hours.
- The emergency spillway of the lower basin should carry the peak runoff from the design storm with a minimum 1-foot of freeboard in the spillway.
- A minimum of 3 total baffles (one in each upper basin, and two in the lower basin) shall be installed in the skimmer basin.

CONSTRUCTION SPECIFICATIONS:

- Construct the basins according to Erosion Control plans with the basin surface free of obstructions, debris, and pockets of low-density material.
- All upper basins shall be constructed as modified Silt Basins Type B, with the lowest basin built as a Skimmer Basin.
- Limit dam heights to 5 feet.
- Install a minimum of two (2) 12-inch slope drain pipes in the berm that separates the upper and lower basin according to the detail.
- Assemble and install the skimmer as instructed by the manufacturer.
- Install skimmer a minimum of 1 foot from the bottom of the basin.

TIERED SKIMMER BASIN  **Detail**

- Coir fiber matting shall be installed under the outlet of the skimmer with minimum dimensions of 9-feet long by 6-feet wide.
- Anchor coir fiber mat with wooden stakes, steel reinforcement rebar, or metal staples.
- Emergency spillways shall have a trapezoidal cross section, with 3:1 or flatter sideslopes, and a minimum base width of 1/3 the basin widths.
- Filter fabric on spillways shall be unrolled in the direction of flow, with edges buried at least five inches deep.
- Install filter fabric to cover the height of the outside of the lower basin berm outlet.
- Anchor filter fabric with 6-inch staples with a maximum spacing of 3 feet.
- Install a total of 3 Coir Fiber Baffles, one in the upper basin, and two in the lower basin of the tiered skimmer basin. The baffle spacing shall be 1/2 the basin length in the upper basin(s), with a spacing of 1/3 the basin length in the lower basin.
- Depending on expected duration of tiered skimmer basin, permanently or temporarily seed all bare side slopes of basins.
- Install matting for erosion control on exposed side slopes after seeding is completed.
- Install a Class B stone pad directly underneath the skimmer device to a minimum height of 12 in., and a minimal cross sectional area of 4 ft. by 4 ft.

MATERIAL SPECIFICATIONS:

- The skimmer shall meet the requirements of the Faircloth Skimmer.
- The filter fabric shall meet the requirements of Section 1056 of the Standard Specifications for Type 2 Fabric.
- Coir Fiber Baffles shall meet the requirements of the Special Provision.
- Coir Fiber Mat shall meet the requirements of the Special Provision.
- Temporary Slope Drains shall meet the requirements of Section 1622 of the Standard Specifications.
- Permanent or temporary seed shall meet the requirements of Section 1060-4 of the Standard Specifications.
- Fertilizer for temporary seed shall meet the requirements of section 1060-2 of the Standard Specifications.
- Matting for erosion control shall meet the requirements of Section 1060-8 of the Standard Specifications.
- All embankment material shall be considered unclassified earth.

PAYMENT:

- Installation of measure:

Silt Excavation	Cubic Yard
Coir Fiber Mat	Square Yard
Filter Fabric for Drainage	Square Yard
Temporary Slope Drains	Linear Foot
**“ Skimmer	EA

TIERED SKIMMER BASIN  **Detail**

Stone for Erosion Control Class B	Ton
Seeding and Mulching	Acre
Seed for Temporary Seeding	Pound
Fertilizer for Temporary Seeding	Ton
Matting for Erosion Control	Square Yard
• Silt cleanout of device:	
Silt Excavation	Cubic Yard

MAINTENANCE:

- Inspect basins after each significant rainfall.
- Basins should be cleaned out when sediment accumulations reach approximately one half the height of the first baffle.
- Check skimmer to make sure that it is not clogged with sediment.
- Check fabric lined spillways for damage.
- Check coir fiber mat at outlet of skimmer for replacement.
- Make sure slope drain pipes are anchored into the berm that separates the basins and they are installed according to the detail.
- During winter, the skimmer should be supported at an angle such that water does not stand in the barrel as this could result in the water freezing and plugging the skimmer.
- Repair seed and replace matting on side slope areas that have eroded or have become damaged by equipment from silt cleanout.
- Remove sediment that may accumulate on stone pad underneath skimmer device.
- Inspect baffles after each rain event for erosion damage.

TYPICAL PROBLEMS:

- Inadequate basin capacities – basins are not constructed to dimensions specified on plans.
- Silt accumulations are not removed when needed.
- Erosion occurring at the outlet of slope drains due to the pipe not extending down to the bottom of the lower basin.
- Presents a safety problem if basins are too deep.
- Skimmer becomes clogged.
- Stone pad underneath skimmer device gets covered with sediment and skimmer becomes embedded in bottom of basin.
- Filter fabric for the spillways are not keyed in well and water washes underneath it and the dams fail.
- Water flows under or around coir fiber baffles and settling time decreases instead of increasing.
- Equipment damages side slopes of basins during silt cleanout causing excess sediment to wash into the basins.
- Erosion of side slopes occurs causing excess sediment to wash into the basins.